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Pest Alert

Oak Wilt in the Northeastern United States

Oak wilt is a deadly vascular disease caused by a fungus (*Ceratocystis fagacearum*) that affects all native oak trees. Oaks are common in the Eastern United States and can be found in more mesic sites mixed in with other northern hardwoods such as sugar maple (*Acer saccharum*) or in drier sites with pines (*Pinus* spp.). Red oaks (northern red (*Quercus rubra*), pin (*Q. palustris*), and scarlet (*Q. coccinea*)) are more susceptible to oak wilt than white oaks (white (*Q. alba*), swamp white (*Q. bicolor*), chestnut (*Q. montana*), post (*Q. stellata)*, and bur (*Q. macrocarpa*)). Red oaks can die within 6 weeks of infection whereas white oaks might take several years to die.

Current Range

Oak wilt was first described in Wisconsin in the 1940s and has since become common as far east as Pennsylvania and as far south as Texas. It is an invasive disease that is expanding its range. Oak wilt was first detected in New York State in 2008 in Glenville. A considerable effort was conducted to eradicate the disease in Glenville. During 2016, the disease was detected in both Long Island in eastern New York and Canandaigua in western New York.

Symptoms

Affected trees start showing symptoms, such as browning of leaves from the edge of the leaf margin inwards towards the base, in July (figure 1). The pattern of symptoms is different between white and red oak species. Infected white oaks die slowly, one branch at a time. In contrast, red oaks die quickly, shedding leaves from the top of the crown downward (figure 2).

Figure 1.—Top: Red oak leaves with oak wilt symptoms. (Courtesy photo by New York State Department of Environmental Conservation)

Middle: Bur oak leaves with oak wilt symptoms. (U.S. Forest Service photo by Danielle Martin)

Figure 2.—Right: Red oak on Long Island with oak wilt symptoms — leaf browning and shedding. (Courtesy photo by New York State Department of Environmental Conservation)

Forest Service

Northeastern Area
State and Private Forestry

NA–PR–02–17

July 2017

Disease Cycle

Oak wilt spreads locally from tree to tree via root grafts. It can also be spread over longer distances by spore-carrying beetles that visit wounds of healthy trees. Once the oak wilt fungus enters a tree, it spreads through the tree's xylem vessels that carry water from roots to leaves. In response to the fungus, the tree plugs the xylem vessels, which causes the wilting symptoms. The fungus produces fungal mats that grow from the xylem towards the bark and create pressure that cracks the bark (figure 3). Fungal mats are produced in red oaks the following fall or spring after they die. Fungal mats release a sweet odor that attracts sap-feeding beetles called Nitidulids (Coleoptera: Nitidulidae). Nitidulids that visit fungal mats become coated with sticky spores that can infect healthy trees.

Management

Oak wilt management hinges on avoiding injury to healthy trees, removing infected trees, and breaking root connections between infected and healthy trees. Infected trees should be removed and debarked, buried, or chipped to prevent the fungus from spreading. Root graft disruption using either a trencher or vibratory plow prevents the fungus from spreading from infected trees to healthy trees (figure 4). Avoid wounding or pruning oaks in the spring and summer when sap beetles that carry fungal spores are active.

If you observe oak wilt symptoms, please contact your local forest health specialist, State Extension Service, and State Departments of Agriculture and Forestry.

For more detailed information, please refer to these publications:

O'Brien, Joseph; Mielke, Manfred; Starkey, Dale; Juzwik, Jennifer. 2011. How to identify, prevent, and control oak wilt. NA–FR–01–11. Reprinted 2017. U.S. Department of Agriculture, Forest Service, Northeastern Area State and Private Forestry. 40 p. https://www.na.fs.fed.us/pubs/howtos/ht_oakwilt/identify_prevent_and_control_oak_wilt_print.pdf. (12 July 2017)

Pokorny, Jill. 1999. How to collect field samples and identify the oak wilt fungus in the laboratory. NA–FR–01–99. Radnor, PA: U.S. Department of Agriculture, Forest Service, Northern Area State and Private Forestry. https://www.na.fs.fed.us/spfo/pubs/howtos/ht_oaklab/info.htm. (12 July 2017)

Figure 3.—Spore mat produced by the oak wilt fungus (*Ceratocystis fagacearum*) in a dead red oak. (Courtesy photo by New York State Department of Environmental Conservation)

Figure 4.—A vibratory plow can be used in oak wilt management to disrupt root grafts and stop the fungus from spreading from infected trees to healthy trees. (U.S. Forest Service photo by Joseph O'Brien)

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